

CLAIMS

We claim:

- 5 1. A biological fluid measuring device, comprising:

 - a housing comprising electronic circuit means and at least two electrodes operably connected to said electronic circuit means; and
 - b) a sensor means operably connected to said electrodes of said housing, said sensor means comprising i) a bioprotective membrane, and ii) an angiogenic layer, said angiogenic layer positioned more distal to said housing than said bioprotective membrane.

10 2. The biological fluid measuring device of Claim 1, wherein said bioprotective membrane is substantially impermeable to macrophages.

15 3. The biological fluid measuring device of Claim 1, wherein said bioprotective membrane comprises pores, said pores having diameters ranging from about 0.1 micron to about 1.0 micron.

4. The biological fluid measuring device of Claim 1, wherein said bioprotective membrane comprises polytetrafluoroethylene.

15 5. The biological fluid measuring device of Claim 1, wherein said angiogenic layer comprises polytetrafluoroethylene.

20 6. The biological fluid measuring device of Claim 1, further comprising c) means for securing said device to biological tissue, said securing means associated with said housing.

7. The biological fluid measuring device of Claim 6, wherein said securing means comprises poly(ethylene terephthalate).

8. The biological fluid measuring device of Claim 1, wherein said sensor means further comprises means for determining the amount of glucose in a biological sample.

9. The biological fluid measuring device of Claim 8, wherein said glucose determining means comprises a membrane containing glucose oxidase, said glucose oxidase-containing membrane positioned more proximal to said housing than said bioprotective membrane.

10. The biological fluid measuring device of Claim 1, wherein said housing further comprises means for transmitting data to a location external to said device.

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11. A device for measuring glucose in a biological fluid, comprising:

- a) a housing comprising electronic circuit means and at least two electrodes operably connected to said electronic circuit means; and
- b) a sensor means operably connected to said electrodes of said housing, said sensor means comprising i) means for determining the amount of glucose in a biological sample, said glucose determining means operably associated with said electrodes, ii) a bioprotective membrane, said bioprotective membrane positioned more distal to said housing than said glucose determining means and substantially impermeable to macrophages, and iii) an angiogenic layer, said angiogenic layer positioned more distal to said housing than said bioprotective membrane.

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12. The biological fluid measuring device of Claim 11, wherein said glucose determining means comprises a membrane containing glucose oxidase.

3. 13. The biological fluid measuring device of Claim 11, wherein said bioprotective membrane further comprises pores having diameters ranging from about 0.1 micron to about 1.0 micron.
4. 14. The biological fluid measuring device of Claim 13, wherein said pores of said bioprotective membrane have diameters ranging from about 0.2 micron to about 0.5 micron
5. 15. The biological fluid measuring device of Claim 11, wherein said bioprotective membrane comprises polytetrafluoroethylene.
6. 16. The biological fluid measuring device of Claim 11, wherein said angiogenic layer comprises polytetrafluoroethylene.
7. 17. The biological fluid measuring device of Claim 11, further comprising c) means for securing said device to biological tissue, said securing means associated with said housing.
8. 18. The biological fluid measuring device of Claim 17, wherein said securing means comprises poly(ethylene terephthalate).
9. 19. The biological fluid measuring device of Claim 11, wherein said housing further comprises means for transmitting data to a location external to said device.
10. 20. The biological fluid measuring device of Claim 19, wherein said data transmitting means comprises a radiotelemetric device.

21. A method of monitoring glucose levels, comprising:

- a) providing i) a host, and ii) a device comprising a housing and means for determining the amount of glucose in a biological fluid; and
- b) implanting said device in said host under conditions such that said device measures said glucose accurately for a period exceeding 360 days.

5 22. The method of Claim 21, wherein said device measures said glucose accurately for a period exceeding 150 days.

23. The method of Claim 22, wherein said device measures said glucose accurately for a period exceeding 90 days.

10 24. The method of Claim 21, wherein said implanting is subcutaneous.

25. A method of measuring glucose in a biological fluid, comprising:

- a) providing i) a host, and ii) a device comprising a housing and means for determining the amount of glucose in a biological fluid, said glucose determining means capable of accurate continuous glucose sensing; and
- b) implanting said device in said host under conditions such that said continuous glucose sensing begins between approximately day 2 and approximately day 25.

15 26. The method of Claim 25, wherein said continuous glucose sensing begins between approximately day 3 and approximately day 21.

20 27. The method of Claim 25, wherein said implanting is subcutaneous.